AR86ctrl

Operating Manual

v1.26

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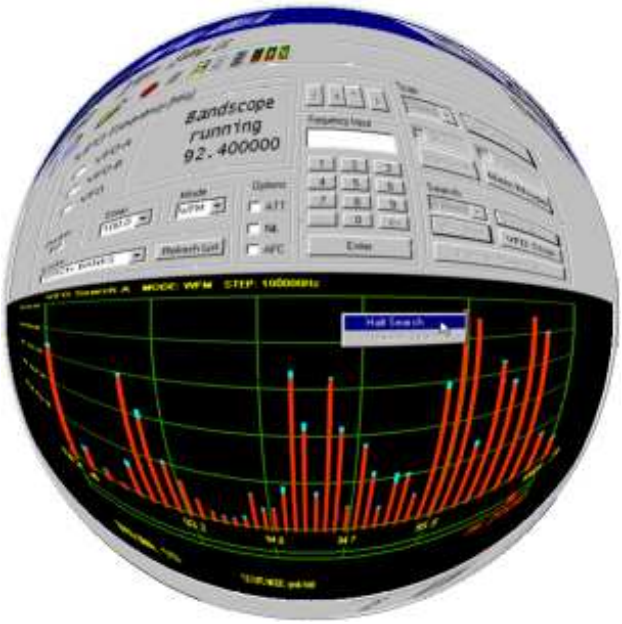

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What's new?

New in v1.26

- set beep volume, welcome message and LCD contrast
- cut, copy & paste functions for memory channels
- memory bank resizing
- store memory contents to disk, using AOR's mem-file format
- reload memory files into memory
- power off button, optionally power off on program exit
- deleting log entries now possible
- improved keyboard support

New in v1.20

- save memory contents to text files in AOR's ".mem" file format
- restore memory contents from ".mem" files, even if the file is from another bank or smaller than the target bank
- cut or copy and paste a memory channel from a bank and move it to another location in the same or a different bank, using Ctrl-c, Ctrl-x, Ctrl-v
- memory bank resizing now supported
- tuning with the arrow keys accelerated
- several bug fixes

Introduction

With Ar86ctrl you can control your AR8600 and AR8200 receiver over a serial port. You need a standard RS-232 cable (AR8600 only) to connect your receiver to your computer. See your AR8600 manual for details. Ar86ctrl will never support the full command set (see end of this document for a list of unsupported or only partially supported commands). Ar86ctrl works faster than most other control programs and does everything in one window.

At the top of the program window you find the usual menu. Most of the commands you can execute from here are also accessible with the toolbar buttons.

Below the buttons, there is the main control in a dialog bar. If you know how to operate your receiver, you will find yourself at home within short time. One of the main features of this program is the possibility to easily access the memory and the search banks in a listview, which is located below the dialogbar. You can do many operations on these list items from a context menu (right click the mouse on an entry). In the lower left corner of the dialog bar you'll find a dropdown list from which you can choose the appropriate list.

There are a lot of options/menu entries that are only active in a certain context. This is meant to simplify the operation of this rather complex receiver and in any case it's better than to bore you with thousand of message boxes telling you that you can't do this or that in a specific mode...

A nice feature is to use your receiver's squelch to automatically generate log files, and to start recording when squelch opens (you can, of course, also start recording manually).

Last not least, there is a bandscope mode. The bandscope is shown in the place where normally the lists are displayed (below the dialog bar).

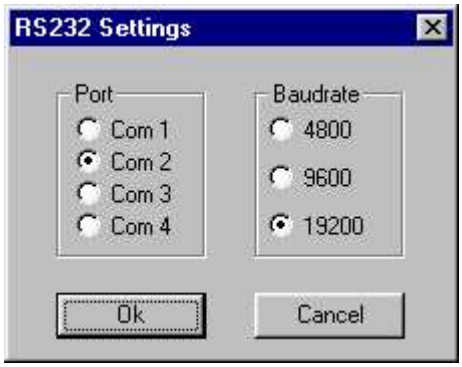
If you need a specific feature or have any suggestions to make the program better, then don't hesitate to contact me by email. My address is kbo@an-netz.de

Requirements

I have tested the program on a 133 MHz Pentium with 32 MB RAM, running Win98, and a faster machine with Win2000. Problems may arise on slow (133 MHz) machines in the bandscope mode (see the bandscope section below for the appropriate settings in that case). Other operating systems or slower machines are not tested. Please report me any problems. You should use a screen resolution of at least 1024x768.

Getting started

First thing you have to do after you have connected your receiver to your computer is to set up the serial port. The AR8600 supports 3 baudrates: 4800, 9600 (factory default) and 19200 Baud. I work with 19200 Baud and have no problems with it. 9600 should also be ok, but 4800 is not recommended (esp. if you want to use the bandscope).



Turn your receiver on and start the program. If it does not connect do the following:

Check and change the AR8600 settings: see manual, page 108.
Setting the program: use Settings -> Serial Port Settings.
After you have clicked OK, the program tries to connect to your receiver. You can see the communication status in the status bar at the bottom right.

When the program starts it reads out some basic information from the receiver like, e.g. the memory bank names. The whole start up procedure should take less than 3 seconds if no communication errors occur.

Communication with the receiver

The program always tries to keep track of your receiver's current status. This means that every command that is sent to the receiver is verified by reading out the setting which was made with this command afterwards.

If a command is not acknowledged by the receiver, the program tries to send it again two times. It may sometimes happen that a command is not recognized. You will then see a message box. Simply repeat the last operation if an error occurs.

Basic Operation

Menu, Toolbar & Statusbar

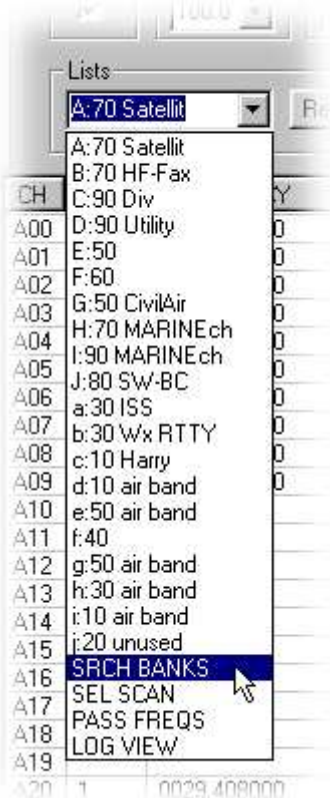
A short description of each command is shown at the bottom in the status bar. To see the status bar, the check mark in the View menu must be active. Other useful information you find in the status bar: "LOG" is flashing when logging into a log file is active, and "REC" flashes if the squelch has opend during a search and/or the program is recording audio. Additionally, the current communication activity between your AR8600 and the PC is shown (IDLE, BUSY, RETRY, ..)

VFO Mode

The AR8600 has 3 VFOs. Choose one with the radio buttons located at the left of the frequency display. Entering a frequency can be done using the mouse and the numeric buttons, or by using your keyboard. Frequency must be entered in MHz. You can use a comma ',' or a dot '.' as the decimal point. You can add only a part of the frequency (e.g. if you want to tune to 3,000000 MHz, type '3' <enter>). Unsupported frequencies are rejected by the program. You can also tune with the arrow keys located above the frequency entry field.

You can start a VFO-search using the button "VFO start". The search runs between the VFO-A and VFO-B frequencies. The settings of the currently active VFO will be used for the search.

Lists



From the dropdown field called "Lists" you can select different lists for display in the list view.

The first twenty entries are the memory banks A-J and a-j. The size and names of these banks are read by the program on every startup and not stored to your harddisk.

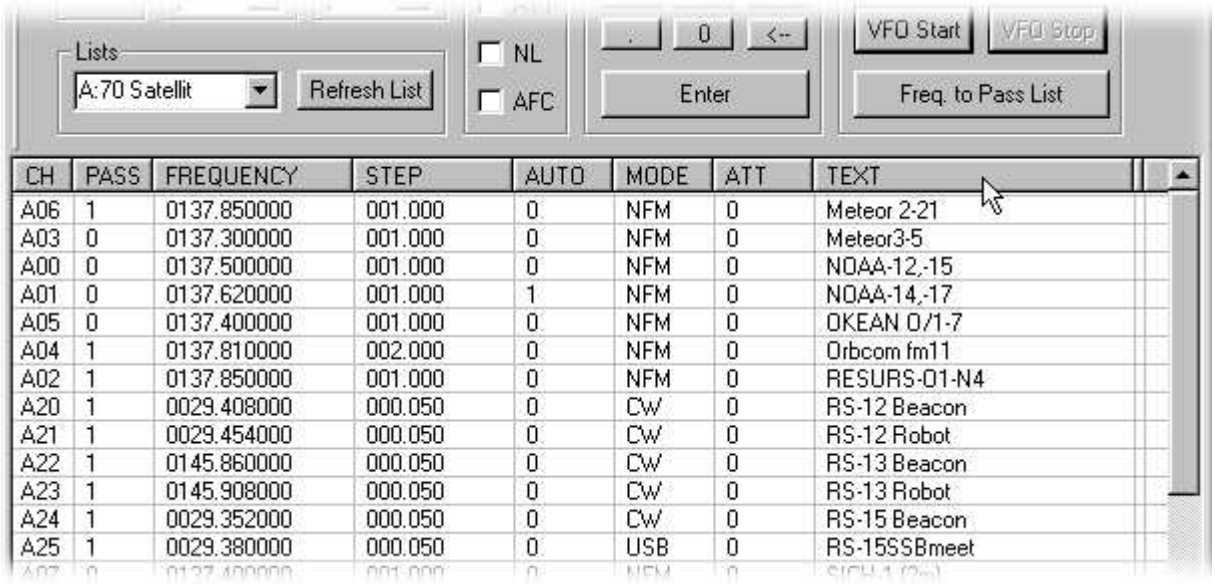
The cursor in the picture on the left points to the first entry that does not represent a memory bank. The last four entries are described later in this document.

Once a list is loaded into view, you can sort the entries by clicking on a list header (e.g. FREQUENCY or TEXT).

Memory Banks

To read out a memory bank from your receiver, use the dropdown field called "Lists". There are 20 memory banks A-J and a-j. Note that if the memory bank has been read out once, it is stored in your computers RAM and if you select it next time it is displayed immediately. This speeds up operation. If you want to read out a bank again, press the "Refresh" Button.

Once a list is loaded into view, you can sort the entries by clicking on a list header (e.g. FREQUENCY or TEXT). The screenshot below shows the listing of memory bank 'A', that has space for 70 entries, sorted by the TEXT field.



CH	PASS	FREQUENCY	STEP	AUTO	MODE	ATT	TEXT
A06	1	0137.850000	001.000	0	NFM	0	Meteor 2-21
A03	0	0137.300000	001.000	0	NFM	0	Meteor3-5
A00	0	0137.500000	001.000	0	NFM	0	NOAA-12,-15
A01	0	0137.620000	001.000	1	NFM	0	NOAA-14,-17
A05	0	0137.400000	001.000	0	NFM	0	OKEAN O/1-7
A04	1	0137.810000	002.000	0	NFM	0	Orbcom fm11
A02	1	0137.850000	001.000	0	NFM	0	RESURS-01-N4
A20	1	0029.408000	000.050	0	CW	0	RS-12 Beacon
A21	1	0029.454000	000.050	0	CW	0	RS-12 Robot
A22	1	0145.860000	000.050	0	CW	0	RS-13 Beacon
A23	1	0145.908000	000.050	0	CW	0	RS-13 Robot
A24	1	0029.352000	000.050	0	CW	0	RS-15 Beacon
A25	1	0029.380000	000.050	0	USB	0	RS-15SSBmeet

To recall a memory channel, either double click on the entry or use the context menu. You can pass an active memory channel to the VFO by pressing <enter> on your keyboard or clicking the "Enter" button.

To store an active VFO into a memory channel point the mouse over the wanted location in the list, then, from the context menu select "Store VFO here...". You will then be asked for a description, after that all settings are stored and the bank is re-read from the receiver.

To change a memory channel you have to first recall it, then pass it to VFO (<enter>), make your settings and store the VFO as described above.

If you change the AUTO, MODE, ATT or PASS status of a currently active memory channel, this change is not reflected in the list until you press the "Refresh List" button. Note that these changes are saved inside your AR8600 even if you don't explicitly save the memory channel. This behaviour is AR8600 specific, and not a problem of the program!

Once you have recalled a memory banks entry, you can start a scan inside that bank by pressing the "Start Scan" button.

You can copy a memory channel using <Ctrl+c> and paste it using <Ctrl+v> into another channel. Target and source channel may be in different banks. You can also cut a channel and then paste it. *Note that the source channel is deleted immediately without any warning!*

Memory Files

From version 1.20 you can store memory bank contents to your harddisk. The file format used is the same that AOR uses, but not all entries are filled in by Ar86ctrl, see the remarks in the following file formant description. The files are plain text files and have the suffix ".mem". You can view and edit them in any text editor (e.g. Notepad if you have nothing better), however be careful with the formatting. Mem-file formatting:

```
DATA IS RECOGNIZED IN AOR WORKSHOP BY IT'S INDEX! (FIXED POSITION IN STRING!)
AR86CTRL handles file during reading a bit smarter. Anyway, we write
data at those fixed positions to be compatible with AOR Workshop.
The file starts with the string "AR8200 extras memory data" and ends with the
"Label: bla bla" string.

          10        20        30        40        50        60
          |         |         |         |         |         |
01234567890123456789012345678901234567890123456789012345678901234567890

AR8200 extras memory data
D00      145.600000  12.50  AUTO NFM                   ham repeater
D01      145.625000  25.00        AM                   ham repeater
D02 P    145.650000  12.50  AUTO NFM                   ham repeater
D03  S   145.675000  12.50  AUTO NFM                   ham repeater
D04   *  145.700000  12.50  AUTO NFM                   ham repeater
D05      145.725000  12.50  AUTO NFM ATT NL AFC XX     ham repeater
D06 ---
D07 ---
D08 ---
D09 ---
Label: bla bla
    #^^                   ##           ^  ^   ^      |-text MUST start at zero based index 55

^ those are not written by Ar86ctrl. If they are present (e.g. in a file that was generated
  with AOR Workshop) they are ignored when reading this file.

# P = PASS is written to file, but ignored when reading file

## AUTO is written to file, but ignored when reading file

The fields are:
channel number, pass (P or blank), sel (S or blank),
protect (* or blank), frequency, step size, automode, mode, attenuator,
noise limiter, AFC, CTCSS tone index XX(if you have the optional CT8200 unit fitted) & comment.
```

For compatibility with AOR Workshop, no TABs are allowed. The AUTO entry may be omitted, it is not used inside the program, i.e. the AUTO flag is always set zero when loading the file into memory. The string "---" stands for an empty bank. At the end there is an entry "Label: ". The text after this string is used for memory bank description. There is a maximum of 8 chars of the description used.

Saving/Loading Memory Contents To/From Disk

To save a memory bank bring it into listview and select "Write Memory Bank Into File".

To load a bank from a file, you must be in memory mode. Bring the target bank into list view, switch to Mem Mode and open the file, using "Write Memory File Into Bank".

When writing a memory bank, global protection and the target bank's protection is switched off and NOT RE-ENABLED!

The program handles any mismatches in file size and bank size for you. If there are any, you will be asked what to do. You can for instance

- load a file into bank 'A' that contains bank 'e'. The bank letter 'e' is adjusted to 'A'.
- load a file with entries beyond the size of the target bank. These entries will simply be skipped.

- load a file with less entries than in target bank available. Some items remain unchanged.

When memory writing starts, do NOT press any button until it's finished. Do NOT switch off your receiver during writing! Look at the status bar. There you see a message when operation has finished.

Memory Bank Resizing

To change the size of a memory bank, the scanner has to be in memory mode. When you start resizing, be aware that this operation can take very long, *up to several minutes*. Do NOT switch off your scanner when resizing is active. Do NOT press any button until operation is finished. Look at the status bar. There you see a message when operation has finished.

Search Banks

Further down the dropdown field called "Lists", you find an entry "SEARCH BANKS". There are 20 search banks inside your AR8600. Note that if the search banks list has been read out once, it is stored in your computers RAM and if you select it next time it is displayed immediately. This speeds up operation.

To start a search in a search bank, either double click on the entry or use the context menu.

To stop a search inside a search bank, click either one of the VFO buttons or switch to memory mode (button Mem Mode).

Select Scan List

Further down the dropdown field called "Lists", you find an entry "SELECT SCAN". Here are those memory channels listed, that are used during a select scan. Memory channels from different banks can be combined here. A select scan can only be started from the context menu, and stopped with the "Stop Scan" button.

Pass Frequencies

Next entry in the dropdown field called "Lists" is "PASS FREQS". Here you find all the frequencies that are flaged as pass frequencies inside your AR8600. There is one pass frequencies list for each of your search banks. Which one is displayed depends on which search bank (or VFO search) is active.

Logfiles

The last entry in the dropdown field called "Lists" is "LOG VIEW". This is the only list, that is NOT from inside your AR8600. It displays the entries of the currently opened log file (or is empty if no file is open). With the context menu, you can play or delete the wav-file (if there is one) associated with a log entry.

Shortcuts

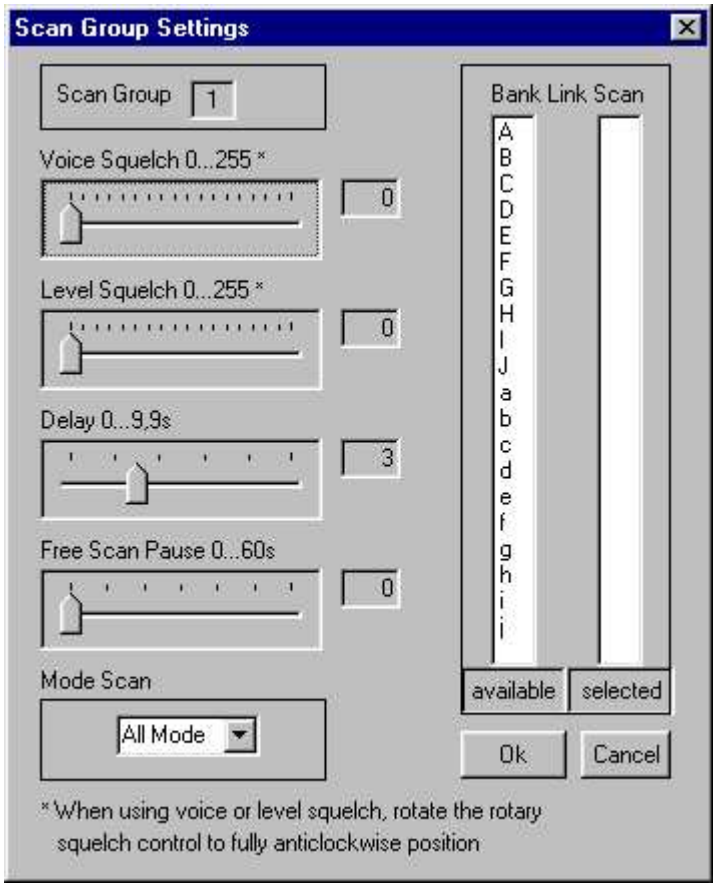
You can control the program using shortcuts. You find a description of those by selecting Help --> Shortcuts. If you are a keyboard freak, you can also activate the option "Optimize for keyboard operation" in the Misc Settings menu. There are some drawbacks on mouse operation when using

this setting, e.g. you have to click twice on a dropdown field to open it. But if you use your TAB key to get to a dropdown, it automatically opens.

Advanced Features

Scan Groups

You find detailed information about scan group settings in your manual, page 66. You have 10 (0..9) so called "scan groups" which you can select from a dropdown list. Scangroup '0' is fixed and is the default scan group. In the other scan groups, you can set the following items.

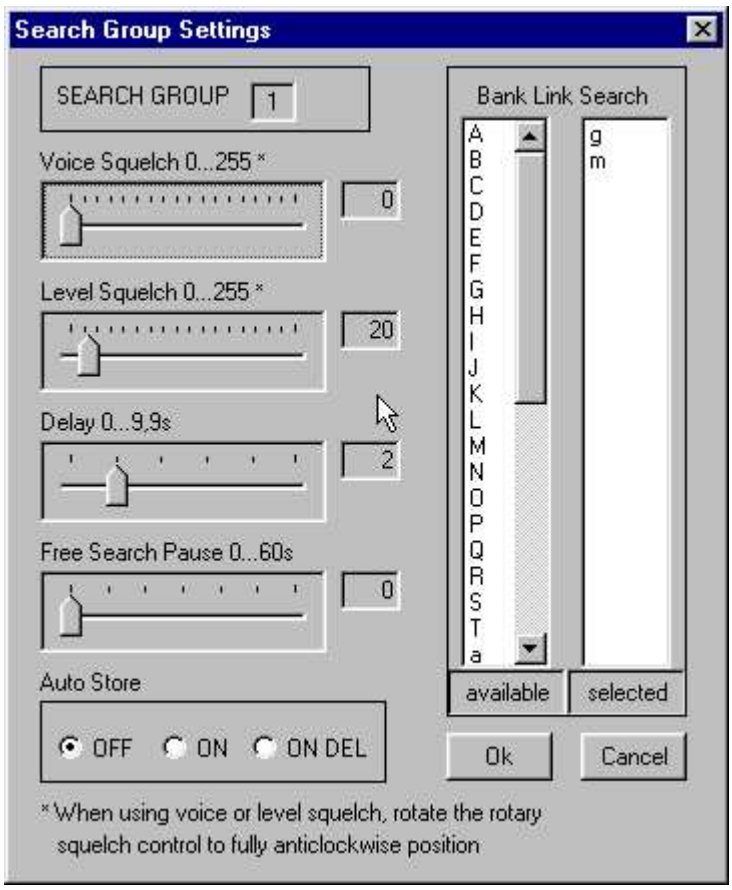


If a slider is set to zero, the function is disabled. Of special interest is the "Delay" slider in conjunction with the log settings. The "Delay" value determines how long the squelch must be closed for the AR8600 to resume scan. *This time should be at least one second longer than the "squelch close time" in the log settings.* Otherwise your log entry (and the audio file, if audio logging is active) might become a mix of different scan channels. The "Free Scan Pause" setting should be disabled (set to zero) when logging is active.

To perform a bank link scan, simply double click those entries you want add to the link list and vice versa.

Search Groups

You find detailed information about search group settings in your manual, page 81. You have 10 (0..9) so called "search groups" plus one search group for VFO, which you can select from a dropdown list. Searchgroup '0' is fixed and is the default search group. In the other search groups, you can set the following items.

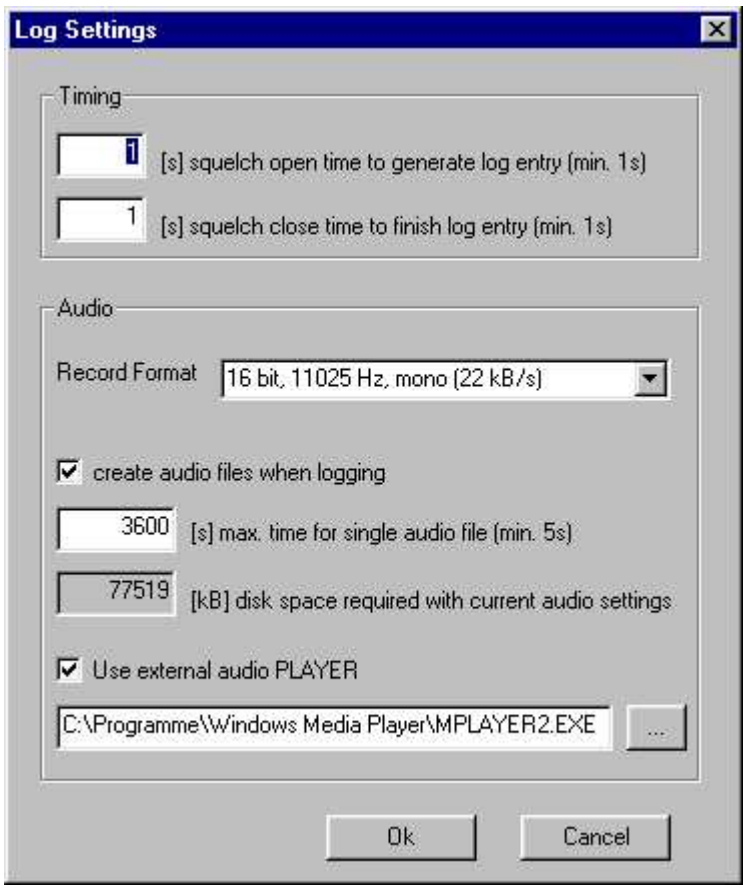


If a slider is set to zero, the function is disabled. Again of special interest is the "Delay" slider in conjunction with the log settings. See "Scan Groups" above.

To perform a bank link search, simply double click those entries you want add to the link list and vice versa. This does not work for the VFO search group.

Log Settings

Logging works squelch controlled. When the squelch opens or closes, the AR8600 sends a command to the PC. You change the conditions of how and when log entries are made in the "Log Settings" menu.



The timing section was already mentioned above with the scan- & search group settings. The setting of these two parameters depends also on the band you work in (noise, fading, etc..). Just experiment with the settings.

Ar86ctrl comes with wave-recording and playing capability. For recording, you have to use the built-in recorder. Choose a recording format from the dropdown list. Only some mono-formats are supported, but for a scanner this should be enough.

The built-in "player" however has absolutely no features, except playing a wave from begin to end :) So please give the path to your favourite audio player and set the check mark "Use external audio player". This player is then called when you doubleclick a log entry in the log list view.

Audio recording can be switched off. If it is activated, you may give a maximum time for recording if disk space is of concern. In the greyed-out field, the program calculates the maximum required disk space per audio file for you. In the example above this means: 3600 seconds = 1h of recording with 16bit, 11025Hz will occupy 77,519 MBytes on your hard disk.

Opening a log file

The default directory for the log files is the ./LOG subdirectory. You can change this if you like. You can open an existing log file or create a new one using the file menu. If you start logging by pressing the "Start Log" button without a log file already open, you will be asked to create one or to use an existing one. New entries are always appended, so if you want to delete a log, you have to do it manually.

Start logging

You can start logging when the VFO is active (single frequency watch) and in any search or scan mode. You can NOT use the logging facility when VFO-A or VFO-B is active. When a VFO search is running (search between the frequency in VFO-A and VFO-B) logging is also available.

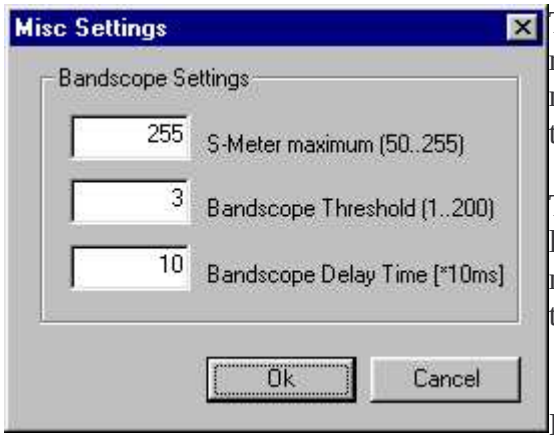
To stop logging, use the "Stop Log" button in the toolbar or the menu entry.

Bandscope

This bandscope is a high resolution bandscope, that has nothing to do with the one you can run on your receivers display!

Important:

- To start the bandscope a search must be already running, because once bandscope is running, the complete dialog bar with the receiver controls is locked.
- Turn your squelch fully CCW when bandscope is running.
- Set up your bandscope in the "Misc Settings" dialog. Your settings are stored in an ini-file on your harddisk.



The S-Meter output of the AR8600 can differ from receiver to receiver. Maybe that on some units, you will never get an S-Meter reading greater than 200. If this is the case, then set your S-Meter maximum value to 200.

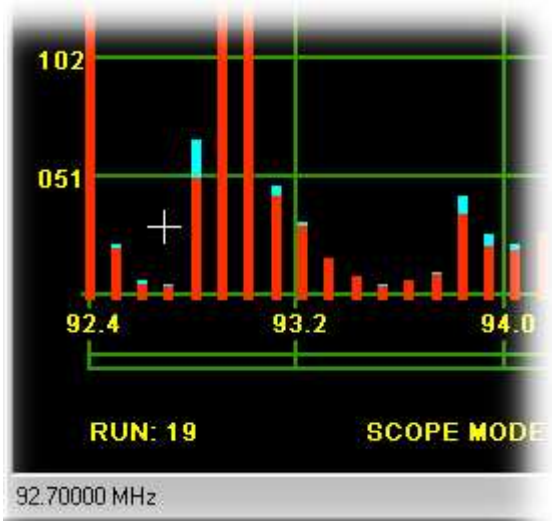
The Bandscope Threshold defines the minimum S-Meter level for a signal to be displayed in the bandscope. In noisy bands like shortwave, you may want to increase this value.

If you run the bandscope within a large spectrum, so that you have a lot of points to be displayed (e.g. a range of 20 MHz in 25 kHz steps, resulting in 800 discrete frequencies) you may run into problems on slower computers. For instance the context menu will not pop up, or the program will not react on your inputs anymore, since the CPU is too busy drawing and receiving continous inputs from the serial port. A solution is to increase the "Bandscope Delay Time". This makes the time for which the AR8600 stays on a single frequency during bandscope search longer. From a Pentium with 200MHz, I think you can leave this value set to zero.

After you have done all the above, you're ready to start the bandscope. It supports three modes:

- normal mode: previous values are overwritten
- peak hold mode: the highest level on a frequency is stored and represented by a blue line, while the current values are displayed using red lines.
- statistic mode: especially useful if you do a lot of search passes over your selected frequency range. Displays the activity on the frequencies in percent.

As mentioned above, nearly all operation on the AR8600 is disabled during bandscope mode. You can, however, halt and resume the search using a context menu in the bandscope display area.



When the search is halted, the cursor turns into a cross, and you can see the current frequency in the lower left corner of the status bar. Now do a single click with the mouse and your receiver is tuned to that frequency. You can do this as often as you like, but you cannot change any other settings (the dialog bar is still locked).

If you switch back to list view, all your bandscope data will get lost and the search is stopped.

If you want to proceed with the bandscope running, choose "Resume Search" from the context menu.

Things that are currently not supported

Option cards

Sorry, but there are no plans to support option cards.

Unsupported and partially supported commands

Not all commands are supported, those with yellow background will probably never be implemented (Options, Internal Bandscope, and all protect commands – useless in my opinion). Others will be supported in future versions of the program. The commands are (in alphabetical order):

Command	Description	Remarks
^A	Remote ID	only ID 0x00 allowed
AM	Bandscope Analyzer	high resolution scope available
BP	Search Bank Protect	
CF	Bandscope Center Frequency	high resolution scope available
CN	CTCSS Operation	option required
DC	Bandscope Date Center Frequency	high resolution scope available
DS	Bandscope Data Analysis	high resolution scope available
DT	Display Frequency On/Off	
EX	Exit RS232	when program is still running: push ENT at the receiver. Automatically executed on program termination.
LS	Tone Eliminator Frequency	option required
MC	Monitor Control	
MF	Bandscope Set Marker Frequency	high resolution scope available
OF	Frequency Offset	
OL	Set And List Frequency Offset	
PC	Protect Memory Channel	
PH	Bandscope Peak Hold	high resolution scope available
PP	Priority Channel	
QM	Quick Memory	
SC	Voice Inverter Frequency	option required
SH	Set Offset Step	
SI	Voice Inverter on/off	option required
SW	Bandscope Span Width	high resolution scope available
TI	Set Priority Intervall	
TS	Text Search	
VR	Firmware Version	
WM	Write Protect Bank	only clearing of this setting is done (when writing a file to a bank)
WP	Write Protect Enable	only clearing of this setting is done (when writing a file to a bank)